

# **Attachment 5**

## **Work Plan**

## Work Plan

### Paso Robles Groundwater Basin

### Analysis of Groundwater Elevation Management Strategies

### San Luis Obispo County, California

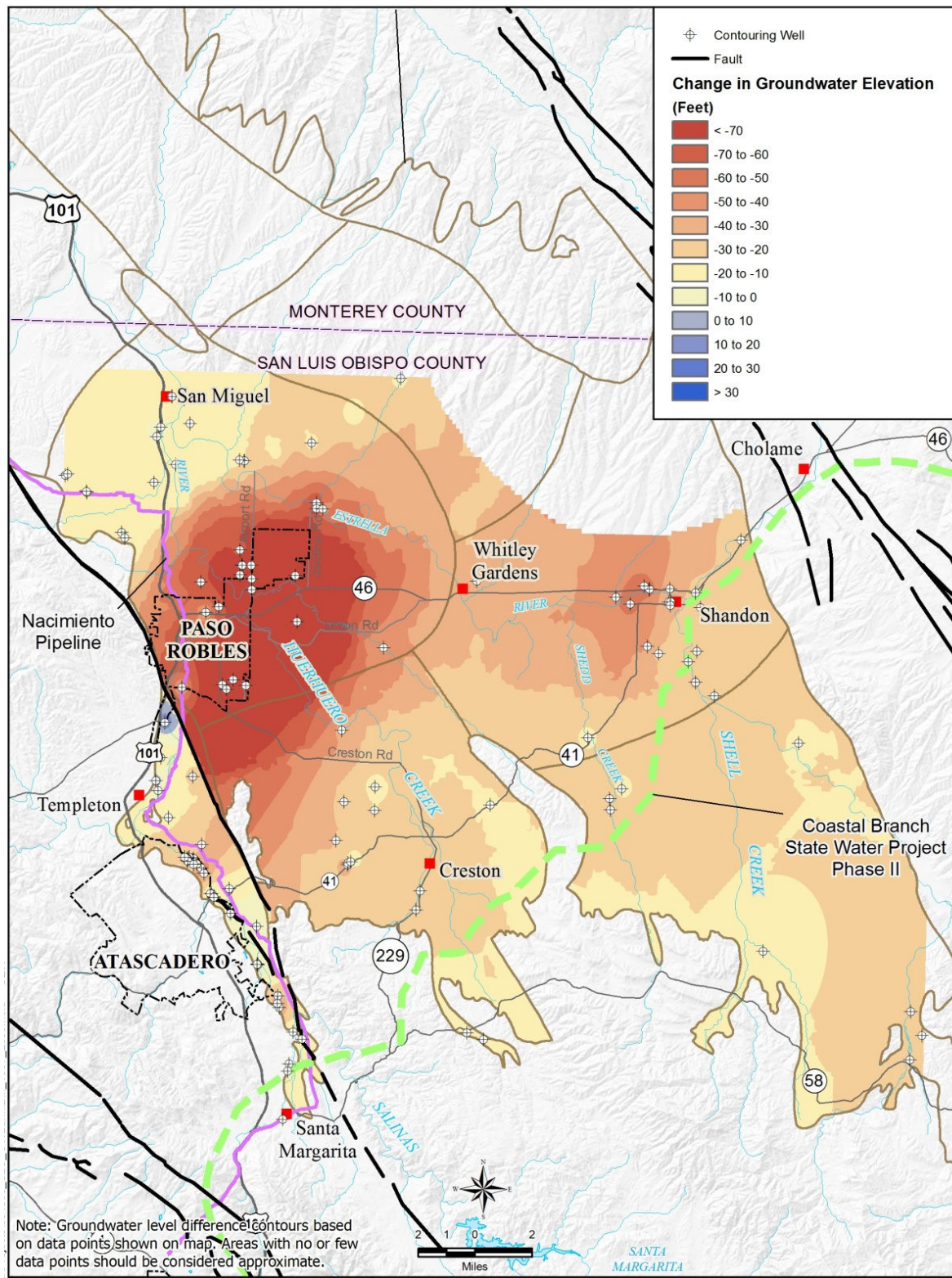
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## Introduction

The following Work Plan for the Analysis of Groundwater Elevation Management Strategies (AGEMS) provides specific details regarding the work that will be accomplished using grant funds and local contributions. The completed project will fulfill the objectives of this proposal to evaluate and compare the cost and effectiveness of selected groundwater management alternatives to improve groundwater levels in the Paso Robles Groundwater Basin (Basin). One of the priorities of the recently adopted Paso Robles Basin Groundwater Management Plan (Plan or GMP) is to identify alternatives to address the ongoing groundwater decline. The Paso Robles Groundwater Management Plan Steering Committee (Steering Committee) was formed to direct the implementation of the GMP.

The original groundwater model for the Paso Robles Groundwater Basin was developed in 2005. The hydrologic period included in the model extended from 1981 to 1997. This model was used to complete the Paso Robles Groundwater Basin Water Banking Feasibility Study (2007). The groundwater model update was identified in the GMP as a priority item. The update will extend the hydrologic period of the model through 2011. This update will almost double the hydrologic period for the simulation, and include the considerable increase in municipal and agricultural demands that have occurred since 1997. The District is proposing to use an existing groundwater model of the Basin that is currently being updated (funded by San Luis Obispo County Flood Control and Water Conservation District) for the purposes of the grant funded project.

The need for this project is demonstrated by **Figure 5-1**, which shows the difference in spring groundwater elevations between 1997 and 2009. During this period, groundwater elevations declined in some parts of the Basin by as much as 70 feet. The groundwater management alternatives evaluated in this project will identify the potential benefits of reducing the groundwater pumping demand in different parts of the Basin. The costs and implementation considerations of the different options to achieve the reduction in groundwater pumping will also be developed to allow for a cost-benefit analysis of each of the groundwater management alternatives.



**Figure 5-1 – Difference in Spring Groundwater Elevation 1997 to 2009**

The groundwater management alternatives were designed to focus on those areas of the Basin with existing groundwater pumping as shown in **Figure 5-2**. The size each of the alternatives is based on the amount of non-groundwater supply that may be available to each of those areas to offset the groundwater pumping from the deep aquifer in that area. The three sources of these supplies include the following:

- **New Supply** – Includes imported surface water supply from either the Nacimiento Water Project (NWP) or the State Water Project (SWP) or a redistribution of pumping in the aquifer system.
  - **State Water Project** - An individual contractor's portion of its SWP annual allocation is presented on Table A of their contract. Table A contract amounts are not a guarantee of the available supply to the contractor each year, but rather a tool in an allocation process that defines an individual contractor's share. The Table A annual allocation for the San Luis Obispo County Flood Control and Water Conservation District totals 25,000 acre-feet . Of this, 9,727 acre-feet per year has been assigned and is referred to as 'Total Reserve,' leaving 15, 273 acre-feet per year as excess allocation. The 2007 DWR reliability report projects delivery amounts to be 66 to 69% of maximum SWP Table A amounts on average. For purposes of this study, the water supply available from the SWP is assumed to be 12,000 acre-feet per year.
  - **Nacimiento Water Project** - The Nacimiento Dam was constructed in 1957 by Monterey County Flood Control and Water Conservation District (now known as the Monterey County Water Resources Agency [MCWRA]). In 1959, San Luis Obispo County secured the rights to 17,500 acre-feet of water per year from Lake Nacimiento. The Nacimiento Water Project, which delivers water to the contracted agencies in San Luis Obispo County, came online in 2011. The current allocations for water from the NWP total 9,655 acre-feet per year. The northern portions of the pipeline and appurtenances have been designed for a maximum withdrawal amount of 15,750 acre-feet per year. For purposes of this study, the water supply available from the NWP is planned to be 6,000 acre-feet per year.
- **Additional Conservation** - Includes additional municipal and agricultural conservation for existing land uses in the area. The level of water conservation for each alternative will be developed to the water supply availability described above.
- **Reclaimed /Recycled Water Program** – Includes previously identified programs to reuse or recycle water. The City of Paso Robles has studied upgrades to their wastewater treatment to a tertiary level of up to 5,000 acre-feet per year. This estimate suggests that the two alternatives (Alternatives 1 and 4 in **Table 5-1**) that may include a reclaimed/recycled water option are reasonable.

**Table 5-1** summarizes the potential project benefit being evaluated at each of the groundwater management locations and the potential sources of supply to offset that local groundwater pumping. For some alternatives, several potential sources of water supplies are considered to reduce the local groundwater pumping. This will allow a range of project costs to be developed for each location.



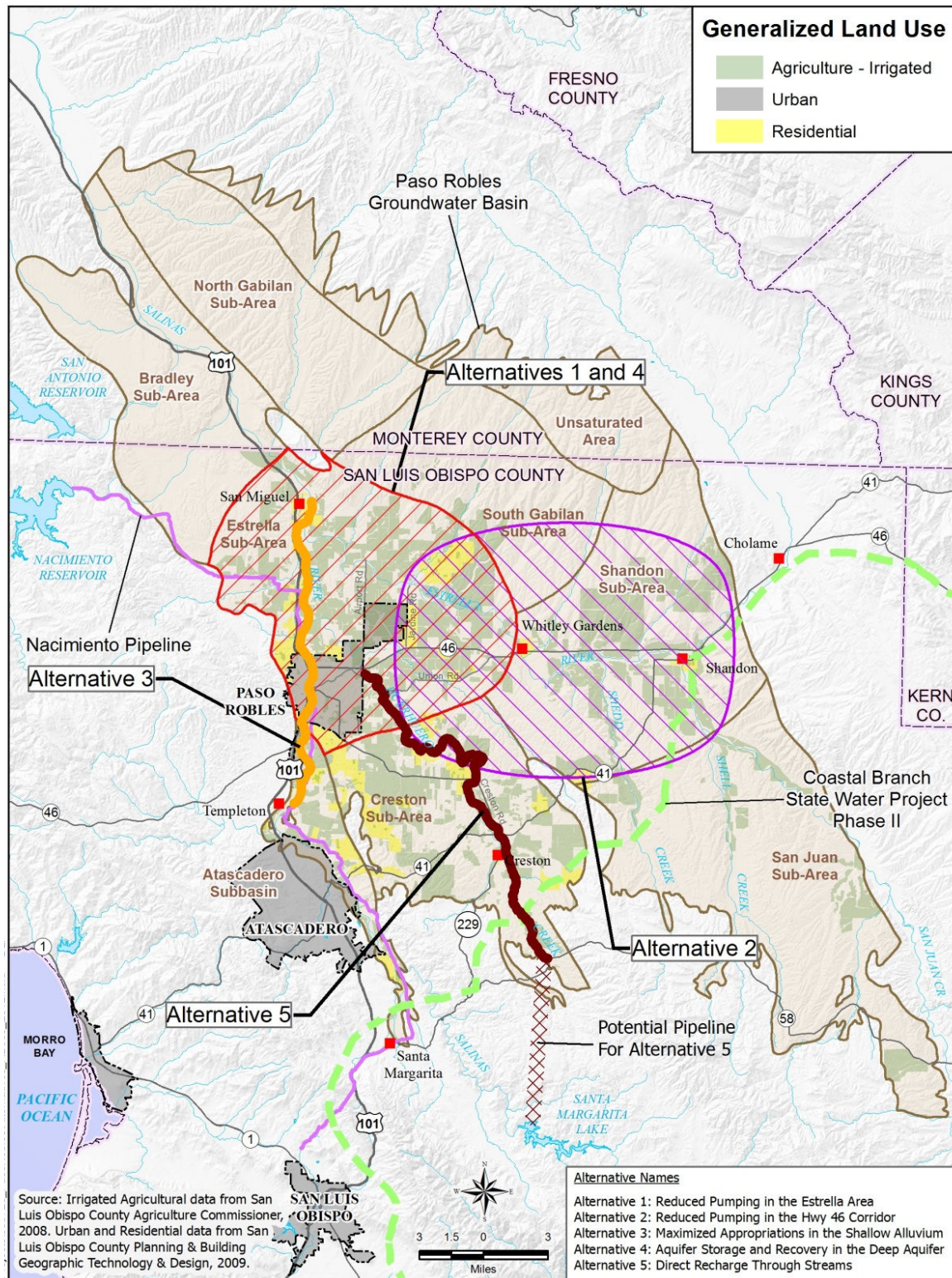


Figure 5-2 – Location of Groundwater Management Alternatives

<b>Groundwater Management Alternative Location</b>	<b>Reduction in Groundwater Pumping Goal (acre-feet) [Project Benefit]</b>	<b>Source of Supply to Offset Groundwater Pumping [Project Costs]</b>
Projected Level Baseline Condition  [This model run is being developed as part of the ongoing update of the groundwater model]	Baseline Condition	Not Applicable
Alt 1 – Reduce Pumping in the Estrella Area	6,000	Nacimiento Water Project
		Additional Municipal and Agricultural Conservation
		New Reclaimed/Recycled Water Program
Alt 2 – Reduce Pumping in the Highway 46 Corridor	12,000	State Water Project
		Additional Municipal and Agricultural Conservation
Alt 3 – Maximize Appropriations in the Shallow Alluvium	2,000	Redistribute Pumping Between Shallow and Deep Aquifer
Alt 4 – Aquifer Storage and Recovery in the Deep Aquifer	6,000	Nacimiento Water Project
		Additional Municipal and Agricultural Conservation
		New Reclaimed/Recycled Water Program
Alt 5 – Direct Recharge Through Streams	2,000	Salinas Reservoir

**Table 5-1 – Summary of Groundwater Management Alternatives**

The purpose of this Work Plan is to describe the specific tasks associated with development of groundwater model data files, completion of the model runs, and analysis and presentation of model and alternatives analysis results. The project work will be documented in technical memoranda and presented to the Steering Committee as they are completed. The final results will be documented in a final report.

The new information gained will be used by the Steering Committee and the local agencies to identify the most viable groundwater supply alternatives to improve groundwater storage conditions in the Basin.

This is a groundwater modeling project of groundwater management alternatives, it does not require access to private property, compliance with CEQA or obtaining of permits, or include environmental compliance activities. Because of this, we believe the Work Plan scoring criteria (4), (6), and (7) included in the May 2012 Local Groundwater Assistance Grant Program Guidelines and Proposal Solicitation Package does not apply to this project.

## **Work Plan and Project Deliverables**

The detailed Work Plan for the Groundwater Management Alternatives Analysis Program includes the following activities:

- Establishing a common understanding among the stakeholders about the groundwater management alternatives being evaluated.
- Conducting the groundwater modeling and evaluating the results.
- Comparing the costs and benefits of each of the alternatives.
- Documenting the project results and communicating them to the Steering Committee and other interested stakeholders.

These activities have been organized into seven project tasks, described in detail in this Work Plan:

Task 1 – Establish Modeling Goals and Objectives

Task 2 – Conduct Modeling and Document Results

Task 3 – Develop Project Costs and Implementation Considerations

Task 4 – Prepare Project Report

Task 5 – Public Outreach and Stakeholder Involvement

Task 6 – Technical Review – QA/QC

Task 7 – Project Management and Coordination

Each task identifies the task schedule, coordination, and project deliverables designed to demonstrate progress of the Project, and to document accomplishments and findings of the Project.

The activities included in this Work Plan will be directed by a licensed California Professional Engineer or Professional Geologist.



## **Task 1 – Establish Modeling Goals and Objectives**

This task will establish a framework for the work to be completed during the course of this Project. This is important because there are many different stakeholders on the Steering Committee, all of whom have differing perspectives of the Basin and varying levels of understanding of the Basin.

### **Subtask 1.1— Document Goals, Objectives, and Modeling Assumptions**

The purpose of this subtask is to establish and document the overall project goals and expectations. This includes documenting the project assumptions of the modeling effort to ensure that the various parties understand the details of the alternatives being evaluated and how they will be compared. For comparison of the alternatives, a set of evaluation criteria will be developed with weighting criteria similar to the process used in the San Luis Obispo County Integrated Regional Water Management Plan. This information will be developed with input from the Steering Committee to emphasize those issues important to the stakeholders in the Basin.

### **Subtask 1.2— Document Groundwater Management Alternatives**

The purpose of this subtask is to document the details of each of the groundwater management alternatives to be evaluated to ensure a common understanding of what is included in each model run. This subtask is needed to prevent model runs from having to be redone because of a lack of clarity and communication between the Steering Committee and the technical team conducting the modeling. The information developed in this subtask is used to support the technical review of the modeling results (included as part of Subtask 6.1).

### **Subtask 1.3— Prepare Technical Memorandum No. 1**

The purpose of this subtask is to prepare a technical memorandum documenting the work completed in this task. It will be distributed to the Steering Committee before Steering Committee Meeting No. 1 for review and to facilitate discussion at the meeting. Comments provided by the Steering Committee or others will be incorporated into the Draft Report (as part of Task 4). A PDF version of the Technical Memorandum No. 1 will be provided to the District for posting on their website.

#### *Task Schedule and Coordination*

This task is scheduled to take approximately two and a half months to complete. Coordination with the Steering Committee will occur through Steering Committee Meeting No. 1 (project kickoff meeting) and Steering Committee Meeting No. 2 to review the results of this task.

#### *Task Deliverables*

- Technical Memorandum No. 1 describing the project goals, objectives, and assumptions.

## **Task 2 – Conduct Modeling and Document Results**

This task will develop the data files, conduct the modeling runs, analyze the model output, and present and document the model results. A total of five groundwater modeling runs will be completed (one each for the groundwater management alternatives identified in Task 1). The following activities will be completed for each of the modeling alternatives:



- Develop input data files for the groundwater model to reflect the groundwater management alternative
- Conduct model run
- Check water balance to ensure the groundwater management alternative is represented appropriately
- Prepare water use and water demand difference tables (difference from the Projected Baseline Condition) to check model input and for model run documentation
- Prepare groundwater level difference map (difference from the Projected Baseline Condition) to identify the affected area of each alternative
- Prepare groundwater level hydrographs at selected locations to identify the magnitude of the difference in groundwater levels (difference from the Projected Baseline Condition) at key points of interest

The benefits of each alternative will be measured in terms of increases in groundwater levels or increases in groundwater storage compared to the Projected Baseline Condition.

The work associated with the modeling of each of the five alternatives is organized in the following subtasks (one subtask for each alternative).

#### **Subtask 2.1— Reduce Pumping in the Estrella Area**

This alternative focuses on the effects of reducing groundwater pumping in the deep aquifer (Paso Robles Formation) of the Estrella Subarea, as shown in Figure 5-2, by about 6,000 acre-feet per year. It is sized based on the unallocated amount of surface water available from the Nacimiento Water Project. For purposes of this analysis, the reduction in groundwater pumping may be achieved from different options including:

- Increasing surface water deliveries from the Nacimiento Water Project to the water users in the Estrella Subarea.
- Implementing additional municipal and/or agricultural water conservation to reduced groundwater demand.
- Developing a water recycling/reuse program to meet selected municipal and/or agricultural demands currently relying on groundwater.

The project costs for each of these options will be developed in Task 3.

#### **Subtask 2.2— Reduce Pumping in the Highway 46 Corridor**

This alternative focuses on the effects of reducing groundwater pumping in the deep aquifer (Paso Robles Formation) along the Highway 46 corridor, as shown in Figure 5-2, by about 12,000 acre-feet per year. This alternative is sized based on the unallocated amount of surface water available from San Luis Obispo County Table A allocation from the State Water Project. For purposes of this analysis, the reduction in groundwater pumping may be achieved from different options, including:

- Increasing surface water deliveries from the State Water Project to the water users in the Highway 46 corridor.

- Implementing additional municipal and/or agricultural water conservation to reduce groundwater demand.

The costs of each of these options will be developed in Task 3.

### **Subtask 2.3— Maximize Appropriations in the Shallow Alluvium**

This alternative focuses on the effects of changing the groundwater pumping patterns (volume and timing) from the shallow alluvial aquifer associated with the Salinas River. Most of the groundwater pumping in the Basin occurs from the deep aquifer (Paso Robles Formation). Along the Salinas River there is an alluvial aquifer that is also used as a groundwater supply. The extent of this project is the Salinas River corridor, as shown on Figure 5-2. This alternative will evaluate changing groundwater pumping patterns in this area between the shallow Salinas River alluvial aquifer and the deep aquifer.

The cost for this alternative will be developed in Task 3.

### **Subtask 2.4— Aquifer Storage and Recovery in the Deep Aquifer**

This alternative focuses on the effects of developing an aquifer storage and recovery (ASR) program in the Estrella Subarea by about 6,000 acre-feet per year. This area of consideration for this project is shown on Figure 5-2. This alternative is sized based on the unallocated amount of surface water available from the Nacimiento Water Project. For purposes of this analysis, the reduction in groundwater pumping may be achieved from different options, including:

- Increasing surface water deliveries from the Nacimiento Water Project to the ASR program in the Estrella Subarea.
- Implementing additional municipal and/or agricultural water conservation to reduced groundwater demand.
- Developing a water recycling/reuse program to meet selected municipal and/or agricultural demands currently relying on groundwater.

The cost for each of these will be developed in Task 3.

### **Subtask 2.5— Direct Recharge through Streams**

This alternative focuses on the effects of reoperating Salinas Reservoir to deliver up to 2,000 acre-feet per year of surface water to Huerhuero Creek to increase stream recharge. This project would require a pipeline to convey the water from the Salinas Reservoir to the upper reaches of the creek as shown on Figure 5-2. This alternative will provide additional information about the stream-aquifer interaction along Huerhuero Creek, and identify potential environmental impacts or benefits of this type of project.

### **Subtask 2.6— Prepare Technical Memorandum No. 2**

The purpose of this subtask is to prepare the technical memorandum documenting the results of the groundwater modeling for each of the alternatives. It will be distributed to the Steering Committee before Steering Committee Meeting No. 4 for review and to facilitate discussion at the meeting. Comments provided by the Steering Committee or others will be incorporated into the Draft Report (as part of Task 4). A PDF version of Technical Memorandum No. 2 will be provided to the District for posting on their website.

### *Task Schedule and Coordination*

This task is scheduled to take approximately seven months. Coordination with the Steering Committee will occur through Steering Committee Meetings No. 2 and No. 3. Steering Committee Meeting No. 4 will be used to review the results of this task.

### *Task Deliverables*

- Technical Memorandum No. 2 describing the model runs

## **Task 3 – Develop Project Costs and Implementation Considerations**

The purpose of this task is to estimate the project costs and implementation considerations for each of the alternatives evaluated in Task 2. This information will be used to establish the cost-benefit of each project to identify the preferred alternative(s) for further consideration.

### **Subtask 3.1— Develop Project Costs**

This subtask will develop a cost estimate method that will allow for comparison of the various groundwater management alternatives being evaluated. This approach will be applied to each of the alternatives on a cost per acre-foot basis. For alternatives with new facilities, a preliminary feasibility-level design and project layout of the required facilities and associated costs will be developed. The approach used in the Paso Robles Groundwater Banking Feasibility Study (2007) will be used as the starting point for the capital and operation and maintenance costs. The capital cost estimates will be based on Means Heavy Construction Cost Data (Means) and adjusted by Engineering News Record cost indices as needed.

For water conservation-based alternatives, unit costs will be developed for incremental water conservation savings. For example, since significant municipal water conservation has already been implemented by the City of Paso Robles, Atascadero Mutual Water Company, and Templeton Community Services District, the next increment of water conservation savings is likely to be more expensive than previous conservation savings on a per unit cost basis. Agricultural water conservation cost estimates will be developed for vineyards and field crops on a per acre basis based on the irrigation improvements needed to achieve the improved level of conservation.

### **Subtask 3.2— Identify Implementation Considerations**

Implementation considerations will be identified for each of the alternatives evaluated. This subtask will identify potential impacts and benefits of each project and describe potential environmental considerations and potential CEQA and permitting requirements for implementation. Additionally, this subtask will include a check for consistency with local, regional, and State policies, and identify any current or needed agreements. It will identify potential financing options based on the affected area and overlying land uses for each alternative.

### **Subtask 3.3— Rank Projects**

The purpose of this subtask is to compare and rank the alternatives based on the project benefits (developed in Task 2) and the project costs and other implementation considerations (developed in this task). The project ranking will be prepared by the technical team for review and acceptance by the Steering Committee. The criteria developed in Task 1 will be used to guide the project ranking process.

### **Subtask 3.4— Prepare Technical Memorandum No. 3**

The results of this task will be documented in Technical Memorandum 3. It will be distributed to the Steering Committee before Steering Committee Meeting No. 4 for review and to facilitate discussion at the meeting. Comments provided by the Steering Committee or others will be incorporated into the Draft Report (as part of Task 4). A PDF version of the Technical Memorandum No. 3 will be provided to the District for posting on their website.

#### *Task Schedule and Coordination*

This task is scheduled to take approximately five months. Coordination with the Steering Committee will occur through Steering Committee Meeting No. 3 (project kickoff meeting) and Steering Committee Meeting No. 4.

#### *Task Deliverables*

- Technical Memorandum No. 3 describing the project costs, implementation considerations, and project ranking.

## **Task 4 – Prepare Project Report**

This task includes the preparation of the draft and final project reports to document the results of the project activities.

### **Subtask 4.1— Prepare Draft Report**

The draft report will be prepared based on the three technical memoranda prepared and distributed to the Steering Committee. Comments received from the Steering Committee will be incorporated into the draft report. The steering committee will have approximately one month to review the draft report and provide their comments. A PDF version of the draft report will be provided to the District for posting on their website.

### **Subtask 4.1— Prepare Final Report**

Comments provided by the Steering Committee and the public on the draft report will be incorporated into the final report. Ten hard copies of the final report and PDF copies of the report will be provided to the District for posting on their website.

#### *Task Schedule and Coordination*

This task is scheduled to take approximately three months. Coordination with the Steering Committee will occur through Steering Committee Meeting No. 4 and Steering Committee Meeting No. 5 to review the results of this task.

#### *Task Deliverables*

- Draft Report
- Final Report

## **Task 5 – Public Outreach and Stakeholder Involvement**

There is an established and very active stakeholder process in northern San Luis Obispo County. This group of stakeholders has been used extensively to address issues and build consensus among a very diverse group of stakeholders in the Basin for many years. Much of the coordination with the



stakeholders in the Basin is conducted through the email distribution list that has been developed over the years and is maintained by the District. Additionally, the District website (<http://www.slocountywater.org/site/index.htm>) is used to communicate to interested stakeholders and the general public about water-related issues in San Luis Obispo County.

This active stakeholder group in the Basin is currently represented by the Steering Committee, which was established in August 2011 following the completion of the Groundwater Management Plan, and has met every month since then to implement the Plan. One of the priorities of the Steering Committee is to identify solutions to the declining groundwater elevations in the Paso Robles Groundwater Basin. Because of these prior efforts, the Steering Committee already has a working communication and coordination network that will be utilized in this project for ongoing project coordination, public outreach, and stakeholder involvement activities.

#### **Subtask 5.1— Participate in Steering Committee Meetings**

While the Steering Committee meeting will continue to meet on a monthly basis, five Steering Committee Meetings have been identified to present project results throughout the 15-month project duration. The meeting dates shown on the project schedule were selected to review project deliverables and to receive input on the next tasks based upon the work completed to date. Steering Committee agendas, meeting minutes, and Summary of the Implementation Progress–Task and Action List are distributed from the District project manager to the current Steering Committee email listing and any other interested stakeholders. Additional information about this project will be provided to the Steering Committee prior to the meetings using this same process.

#### **Subtask 5.2— Conduct Public Outreach**

The District website (<http://www.slocountywater.org/site/index.htm>) will be used as the primary mechanism to distribute documents and project notifications to the interested stakeholders and the general public as part of the public outreach program. Public outreach will take place throughout the duration of the project. This will also be used to facilitate information dissemination and project coordination with other local, State, and federal agencies.

### **Task 6 – Technical Review – QA/QC**

The purpose of this task is to conduct technical review and quality control and quality assurance checks at specific steps in the project to ensure the overall quality of the project work and that it is meeting the project goals and objectives established in Task 1. This technical review will be conducted by individuals familiar with the project, but not involved in the day-to-day project activities. It will provide additional review and expertise to the project to ensure it meets the expectations of the local project participants and stakeholders. The technical review is expected to take place at three specific areas, which are identified as the subtasks below.

#### **Subtask 6.1— Conduct Modeling Technical Review**

This subtask will provide technical review of the modeling work completed as part of Task 2. It will rely in part on the work completed in Task 1 to provide guidance to the QA/QC process.

Additionally, as part of the QA/QC process, the source information (i.e., water demands, land use, pumping estimates) will be checked with both the model input data and output data to ensure it is incorporated appropriately. The model alternative model runs will be compared to the sensitivity

runs completed during the model update to make sure the resulting water budgets and groundwater levels are reasonable. All the technical review and QA/QC activities will be completed by a California Professional Engineer or Professional Geologist familiar with the Paso Robles Groundwater Basin and the available models, but not part of the project team completing the analysis.

#### **Subtask 6.2— Conduct Project Costs Technical Review**

This subtask will provide technical review of the project cost assumptions and implementation considerations developed as part of Task 3. It will rely in part on the work completed in Task 1 to provide guidance to the QA/QC process. The project costs will be reviewed and checked to ensure appropriate unit costs and quantities are applied to each alternative.

#### **Subtask 6.3— Conduct Report Technical Review**

This subtask will provide technical review of the draft report prior to it being released to the Steering Committee.

### **Task 7 – Project Management and Coordination**

The District will provide communications to DWR regarding project status throughout the project duration.

#### **Subtask 7.1— Prepare Invoices and Progress Reports**

Invoices and progress reports will be submitted to DWR quarterly and discussed via teleconference. The progress reports will include a summary of activities for the last quarter, activities for the upcoming quarter, and a review of budget and schedule status.

The progress of the project will be proven through submittals of project documents to DWR for review and approval. These include:

- Technical Memorandum No. 1
- Technical Memorandum No. 2
- Technical Memorandum No. 3
- Draft Report
- Final Report

DWR will be provided an opportunity to review and comment on all project deliverables. DWR comments will be addressed before finalizing the Program reports.

A final Project Close-out Report will be prepared at the conclusion of the project to document that the work corresponded to this Work Plan, any deviations, project findings, project completion related to schedule and budget, and submittal of all data collected. The reports will be submitted to DWR in hard copy and electronic format.

In addition, the District will implement procedures to maximize effective project management by:

1. Selection of a technically competent project team
2. Using a systematic cost/schedule control system

3. Preparing contracts and task orders to specify the activities, work products, and project schedule
4. Establishing quality control procedures
5. Standard review checking procedures

#### **Subtask 7.2— Provide Project Coordination**

Throughout the project and at its conclusion the District will provide overall project coordination, including updates to the Steering Committee at their regular meetings as to the progress of the work and findings. The Steering Committee meetings are open to the public and will be advertized on the District's website.